## Measurement of PVT Behavior of Ecologically Safe Refrigerants

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A Burnett-type apparatus has been developed for the determination of the compressibility factor of gases, capable of operation from near room temperature to 500 K at pressures to 60 MPa. The purpose of this work was twofold: to asses the accuracy of the present instrument and to obtain compressibility factors and virial coefficients for 1,1,2,3,3,3-heptafluoropropane (HFC 227).

The apparatus was first calibrated with helium to obtain the cell distortions with pressure and temperature and the zero-pressure apparatus constant. To verify the performance of the apparatus, measurements on 1,1,1,2-tetrafluoroetane (HFC 134a) have been made and their results have been compared with the internationally agreed equation of state by Tillner- Roth and Baehr. Burnett expansion measurements with HFC 227 have been performed at nominal isotherms 393, 433 and 473 K up to 50 MPa. The variant of the evaluation procedure based on virial equation in density was employed to calculate densities and virial coefficients from the pressure data obtained. The experimental uncertainty of the measurements is estimated to be to  $\pm 0.0002$  in pressure,  $\pm 0.001$  in density at highest pressures and  $\pm 0.0002$  at lowest pressures and  $\pm 0.005$  K in temperature (the total uncertainty due to the thermometer and the bath instability). Criteria for evaluation and construction of the optimum data reduction procedure are discussed.